RACETIME 2

OptoJump Program

User Manual

Revision 1.00

MICROGATE

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Index

1 INTRODUCTION 3

2 CONNECTING THE OPTOJUMP SYSTEM 3

3 SWITCHING ON RACETIME 2, INITIALIZATION 3

4 MAIN MENU 5

5 NEW TESTS 9

6 TESTS PERFORMED 20

7 RECHARGING BATTERIES 22

8 MEMORY LIMITS 24

9 APPENDIX 1 - RACETIME 2 TRANSMISSION PROTOCOL FOR OPTOJUMP 25

10 APPENDIX 2 - FORMULAS FOR THE CALCULATION OF POWER AND WORK 26

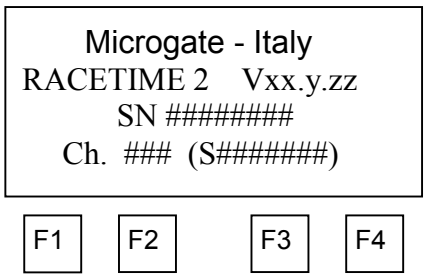
1 Introduction

The Optojump program for Racetime functions along the same lines as the Optojump program for PC, with which it is totally compatible, in this sense, that it allows the transference of data acquired with Racetime 2 to the personal computer for subsequent elaboration and storage of the data.

2 Connecting the OptoJump system

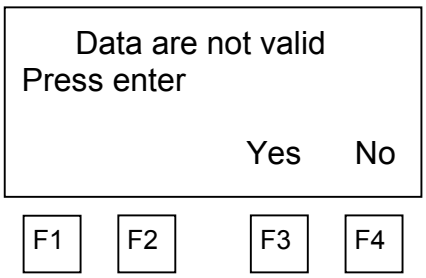
Make sure that the Optojump modules are correctly aligned, as indicated in the Optojump system assembly instructions. Connect the cable coming from the interface/battery for Optojump to the socket located at the rear of the Racetime 2 chronometer using the appropriate 9 pole/15 pole adaptor. Now the system is ready to function.

3 Switching on Racetime 2, initialization

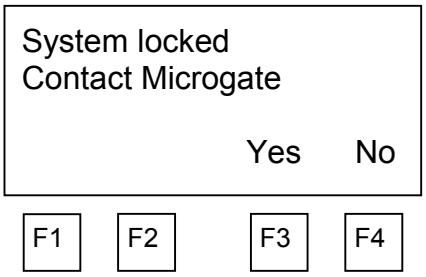


Switch on Racetime 2 with the switch located on the back of the device. The display will show several items of information about the software version installed on your Racetime 2, and the serial number of the device.
If you have to contact Microgate for any information or about any problems, always give the serial number of your system.

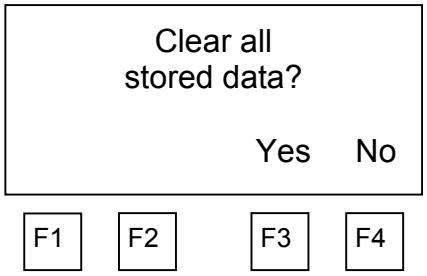
Press a key to continue.
At this point the following screen displays may appear:



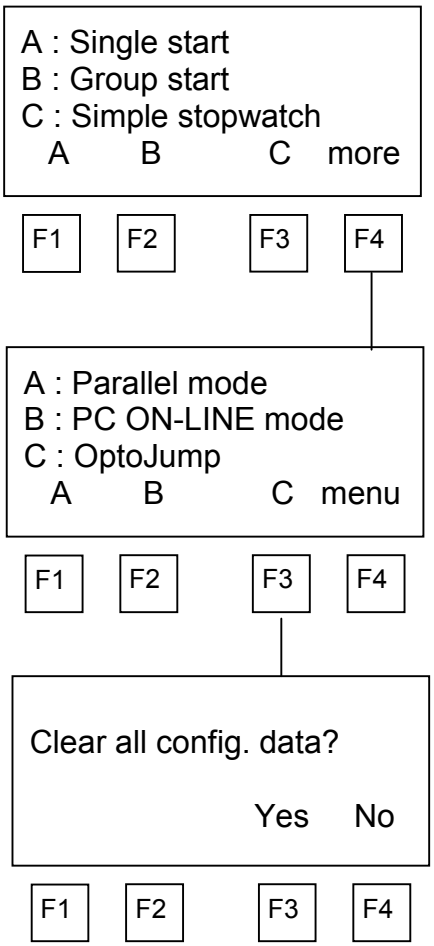
Check to see if the device was completely emptied after the previous work session. Any previously memorised data has been irretrievably lost. Press ENTER to continue.



Check to see if any anomalies were discovered during initial tests on the machine. Contact Microgate for further information.



Usually appears after switching on. Press F3 to delete previously memorized data (your choice must be confirmed).



Should you have canceled the memorized data, if your Racetime 2 chronometer is equipped with other timing programs (in addition to the Optojump management program), you can select the function mode.
To select the Optojump program, first press F4 (other) to pass to the second screen display.

Now press F3 (C: Optojump) to enter Optojump mode.

These operations are not necessary if your Racetime 2 is equipped with only the Optojump program.

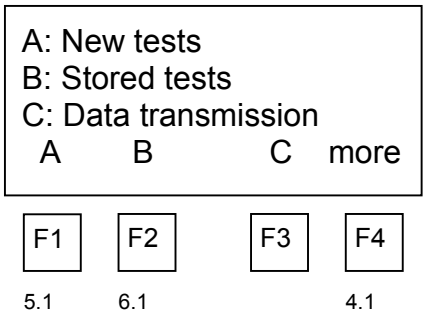
If the data memory has not been canceled or the Optojump mode was chosen in the previous work session, you can set configuration parameters automatically on standard values, namely:

- Automatic printout on confirmation of test: deactivated
- Average value calculation mode: on all values
- Number of WalkJump modules: 6
- WalkJump start mode: manual
- WalkJump timeout: 0s (deactivated)
- WalkJump step minimum length: 41cm
- WalkJump direction: entrance from interface side
- WalkJump automatic acquisition: deactivated
- OptoJump test start: from inside measurement base

The meaning of each parameter will be clear when you have become familiar with the different types of test, which are described in the following pages.

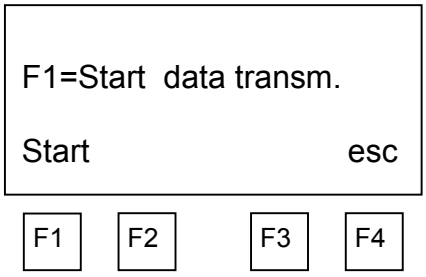
4 Main menu

After choosing the OptoJump program on the chronometer (see chapter 3 - choosing the program is obviously not necessary if your Racetime 2 is equipped with only the OptoJump program), you enter the main menu, from which it is possible to access all the available functions.



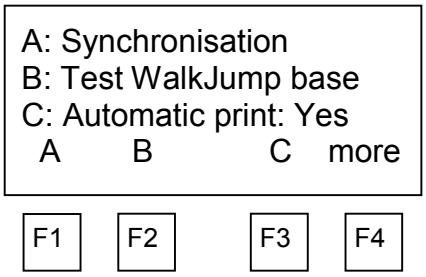
F1 – New tests – To enter the menu for the selection of the tests to be performed (chap. 5)

F2 – Tests done – To access the menu for the display of previously memorized tests (chap. 6)



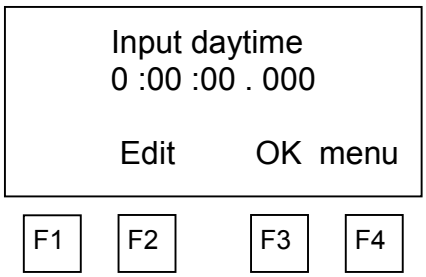
F3 – Data transmission – Activates the transmission of memorized data to the PC. Connect the PC to Racetime 2 with the appropriate cable (Cod.CAB046 or Cod.CAB047 + Cod.CAB001), and press F1 (Start) to confirm the start of transmission. The memorized data is transmitted according to the protocol given in the Appendix. For reception, we recommend you use the OptoJump program on PC (versions 3.20 and subsequent). In this way the transferred data will be stored and can be viewed as if it had been acquired directly with the Personal Computer.

4.1

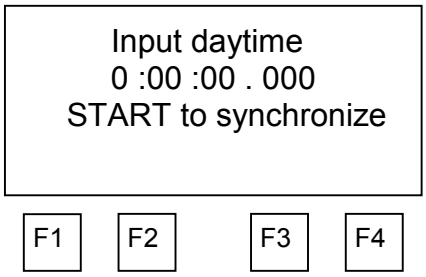


F1 – Synchronization – Allows you to synchronize Racetime 2's internal clock. This function should be used when you employ two or more Racetime 2 systems in WalkJump mode with automatic acquisition. See chap. 5.10 for further information.

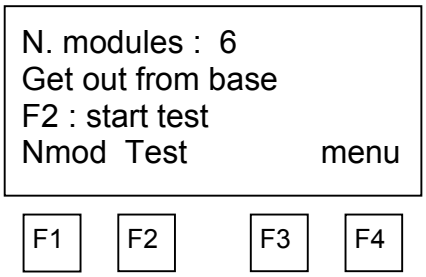
F3 – Automatic printout: Yes/No – Select 'Yes' if you want the tests performed to be printed automatically after they have been confirmed. Modify your choice (Yes/No) by pressing F3 repeatedly.



Set the exact time and confirm with F3 (OK). To correct the setting, press F2 (Edit).

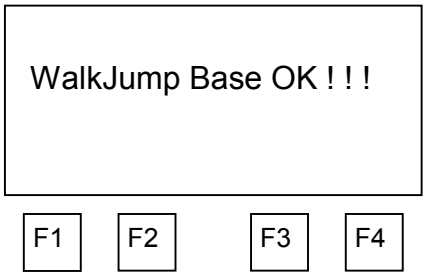


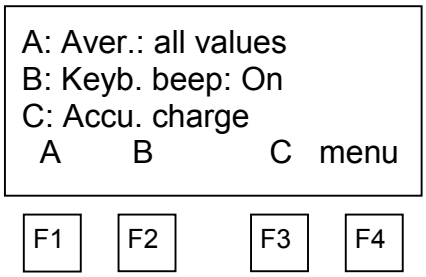
Press START or activate the START input to synchronize the internal clock.



4.2

F2 – WalkJump test base – This functions allows you to verify the correct alignment of the OptoJump bars when two or more modules have been connected to each other for the acquisition of contact and flight times and of step lengths during a run (WalkJump test).
After selecting the test, press F2 (Test), as indicated on the display, to begin the test itself.
Press F1 (Nmod) to set the number of modules present on the track.
ATTENTION: for correct functioning of the test, it is essential that the number of modules set on Racetime 2 corresponds exactly to the number actually present on the measurement base.
Select F3 (menu) to return to the main menu.
The alignment test checks the measurement base for about 10 seconds (during this time the message 'Please wait' is shown). This time is normally enough to signal inaccurate alignments which cause ''intermittent'' interruptions at some points of the base, and which therefore may escape detection by 'visual' control (green 'SIGNAL' led on all the modules).
After data acquisition, the points at which an interruption has been detected are displayed. Each module includes 32 sensors, numbered from 1 to 32. Module 1 and sensor 1 are considered to be those which are near the connection cable between modules TX and modules RX. To view the next interrupted sensor, press F1 (Next). Press F4 (esc) to return to the main menu.
If on the other hand alignment is perfect, a message of confirmation is displayed.



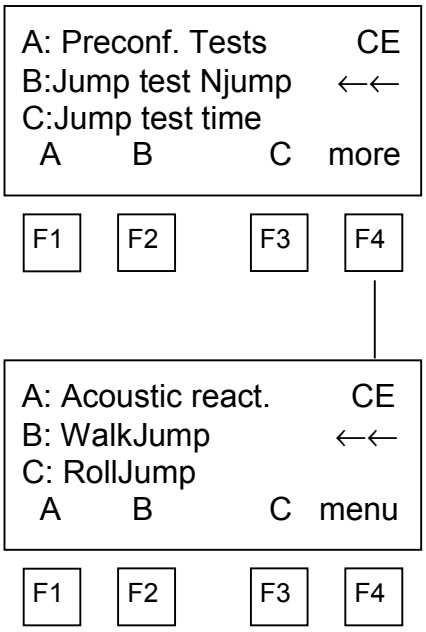


4.3

F1 : Averages : all values/minimum and maximum excluded – If 'all values' is chosen, the average values of the measurements acquired (flight times, contact times, etc.) are calculated on the basis of all the values acquired during the single test.
If on the other hand 'excl. min/max' is chosen, the values for the jumps in which the minimum and maximum flight time has been measured will be excluded.
Note: the exclusion of the minimum and maximum values occurs only if at least two jumps with flight and contact times different from zero exist, i.e. if at least two jumps starting from inside the measurement base have been made or three jumps if the jumps are made outside the measurement base.
To modify your choice, press F1 repeatedly.

F2 : Key beep : on/off. Select 'off' to deactivate beep emission when the keys are pressed.
To modify your choice, press F2 repeatedly.

To return to the first screen display of the main menu, press F4.



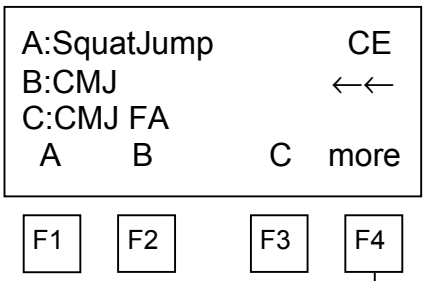
5 New tests

From this menu you can select the various types of test that you wish to make. Press CE to return to the main menu.

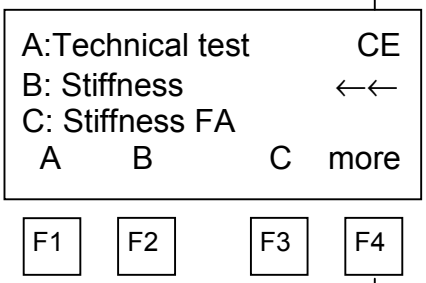
5.1

F1 – Preconfigured tests

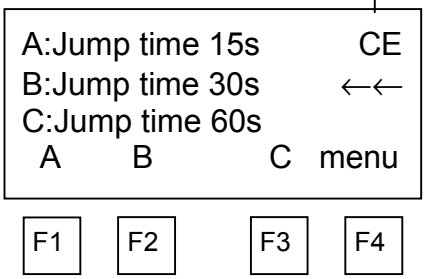
Enables you to choose tests in which the mode of operation is predefined; it is therefore not necessary to specify the number of jumps to be made, the duration of the test or the start mode from inside or outside the measurement area.
Below you will find a list of the acquisition modes of the preconfigured tests. Many tests have the same acquisition sequences. They are dealt with separately so as to distinguish between the various tests according to the different body movements (arms free/arms at sides, etc.) involved in each one.



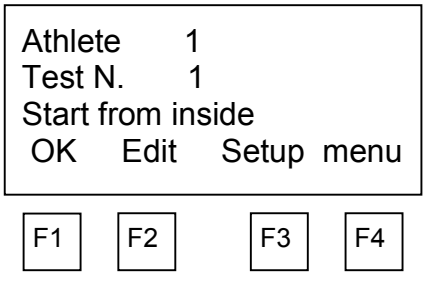
Squatjump, CMJ (Countermovement), CMJ FA (Countermovement arms free), Technical test:
3 jumps starting from inside the measurement area



Stiffness, stiffness FA (arms free): 7 jumps starting from outside the measurement area



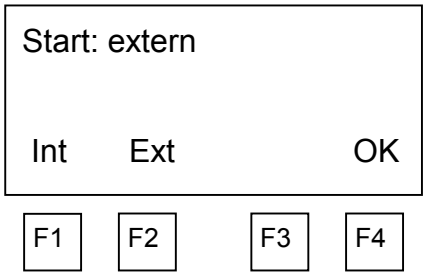
Jump time 15, 30, 60s : test with predefined duration of 15, 30, 60s, starting from inside the measurement area.



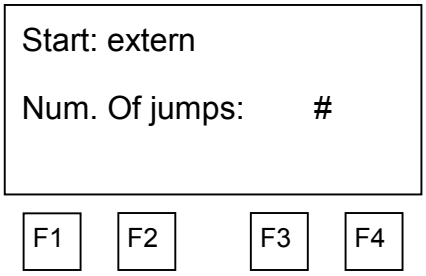
After selecting the type of test you wish to perform, you will see the number of the athlete and the number of the test for the trial you will carry out.
(Important: the combination athlete's code/number of test is a single item, which means that Racetime 2 does not allow the same athlete to perform two tests indicated by the same test number).
To modify the athlete's and/or the test number, press F2 (Edit.). Press F3 (Impos) to modify the test settings (see following paragraph).

To confirm the settings and to go on to the performance of the test, press F1.
See the following paragraph for an explanation of the values displayed during the test.

5.2

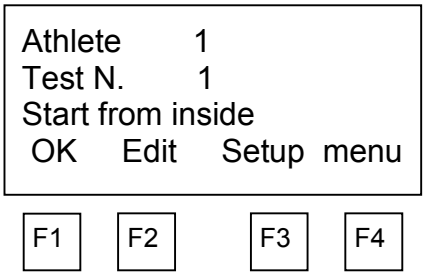


F2 – Jump test jumps
Select this mode to perform tests with a pre-established number of jumps.
After selecting the test, select the start mode (i.e. the position of the athlete at the start of the test) with the keys F1 (test start from inside the measurement area) or F2 (test start from outside the measurement area).
Press F4 (OK) to confirm your choice.



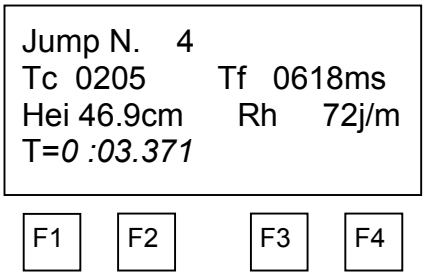
Insert the number of jumps you wish to make.

5.3



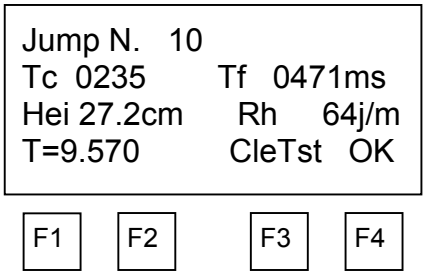
Racetime 2 will then show the athlete's code and test.
(Important: the combination athlete's code/test number is a single item, i.e. Racetime 2 does not allow the same athlete to perform two tests indicated by the same test number).
Choose F1 (OK) to confirm the setting and to begin the test.
By pressing F2 (Edit.) you can correct the number of the athlete and/or test.
F3 (Impos) will return you to the setting of the start test mode and of the number of jumps.
To return to the 'New tests' menu, press F4 (menu).

5.4



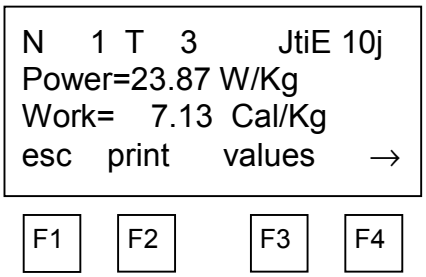
At this point, Racetime 2 is waiting for the start of the test. If the athlete's position does not correspond to the start type settings (from inside or outside the measurement base) an error message is displayed.
During performance of the test, the following information is displayed:

- Serial jump number
- Contact time for the present jump
- Flight time
- Height of jump (shift of center of gravity) of the athlete being tested
- Instantaneous rhythm in jumps/minutes
- In the lower part of the display, a running time indicator shows how much time has passed since the start of the test.



The end of the test is signaled by a beep.
The test can be interrupted before completion by pressing CE.
Attention: if the test is interrupted, the data acquired up to this point is NOT saved.
It is possible to confirm by pressing F4 (OK) or to annul the whole test by pressing F3 (CleTst).

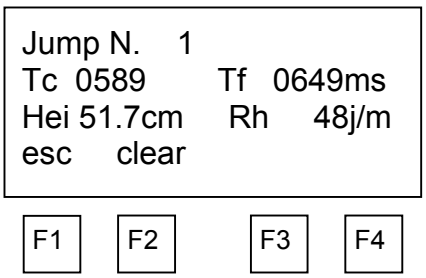
5.5



If the test is confirmed (F4), the specific power (W/Kg) developed during the test and the specific work (Cal/Kg) performed are displayed.
On the first line of the display appear the athlete's code and the test number and test type, with the following meaning:
JnbE=Jumptest jumps, external start
JnbI=Jumptest jumps, internal start
After this the number of jumps set is also given.

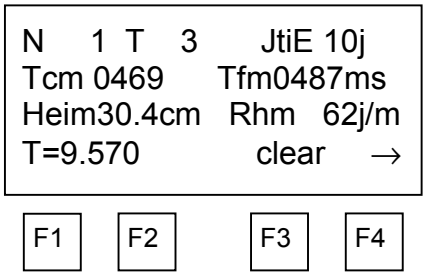
To go on to the next test, press F1 (esc). The values of the test performed are of course memorized for subsequent printing.

To obtain a printout of the values measured, press F2 (print); for each jump, contact time, flight time, height and instantaneous rhythm are printed. The average values for some measurements are given, as well as strength and work.
Note: printing takes place automatically when you pass to the next test if the automatic print mode has been set – see chap. 4.1.



5.6

Press F3 (values) to pass to the screen display of the single jumps; press keys ↓ and ↑ to view the next or previous jump respectively. F2 (clear) eliminates the jump displayed. (Attention: it is not possible to annul elimination). F1 (esc) returns you to the display of average values.



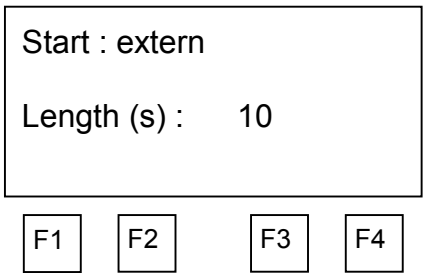
5.7

By pressing F4 (→) you enter a second screen display in which you can see the average values for contact time, flight time, height and rhythm, as well as the real duration of the test (calculated from the first departure from the ground until the last contact with it if the start is from outside the measurement area; if on the other hand the start takes place from inside the measurement area, the first departure from the ground is taken as the moment of the start).
From this screen display, it is possible to completely eliminate the test performed by pressing F3. (Attention: it is not possible to annul elimination).
Press F4 again to return to the previous screen display.

5.8

F3 – Jump test time

Select this mode to carry out tests of pre-established duration.
After selecting the test, choose the start mode (i.e. the athlete's position at the start of the test) with the keys F1 (test start from inside the measurement area) or F2 (test start from outside the measurement area).
Press F4 (OK) to confirm your choice.
Insert the duration of the test, in seconds.
Racetime 2 will then display the athlete's code and the test.
For performance of the test and the data displayed, refer to the previous paragraph (Jump test number of jumps).

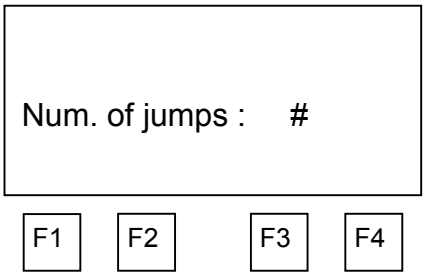


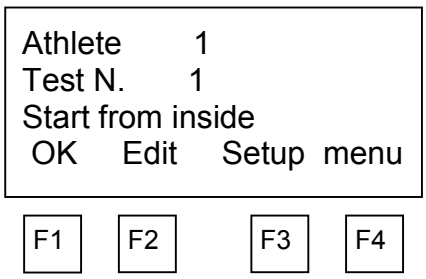
During the display of average values (at the end of the test), the code will be shown as follows:
JtE=Jumptest time, external start
JteI=Jumptest time, internal start

5.9

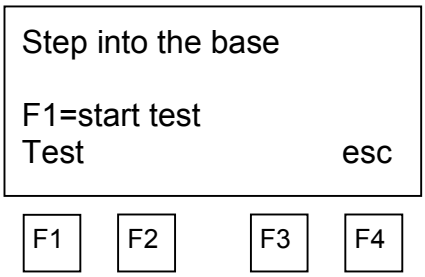
F1 Acoustic reaction

The acoustic reaction test makes it possible to evaluate the reaction time of an athlete to a randomly generated acoustic signal.
After selecting this type of test, the number of jumps (i.e. subsequent tests) to be made must be set.





Racetime 2 will then show the athlete's code and the test code.
(Important: the combination athlete's code/test number is a single item, that is to say, Racetime 2 does not allow the same athlete to perform two tests indicated by the same test number).
Choose F1 (OK) to confirm the setting and to begin the test.
By pressing F2 (Edit.) you can correct the number of the athlete and/or test.
F3 will return you to the setting of the number of tests.
To return to the 'New tests' menu, press F4 (menu).



After confirming with F1, make sure that the athlete is situated inside the measurement area and confirm with F1 (it is possible to return to the previous screen display with F4).
An initial beep simply signals the start of the test.
From this moment, within a time varying from 2 to 6 seconds, a second beep will be emitted. Racetime 2 measures the time between this signal and departure from the measurement area. Flight time, i.e. the time from departure from the base to the athlete's subsequent return to it, is also measured.
Consequently, the test can also be made by getting the athletes under trial to follow a pre-established course, so measuring the time taken to cover a distance. It is clear that in this case the height measured is of no significance.

The test can be interrupted before completion by pressing CE.
Attention: if the test is interrupted, the data acquired up to this point is NOT saved.

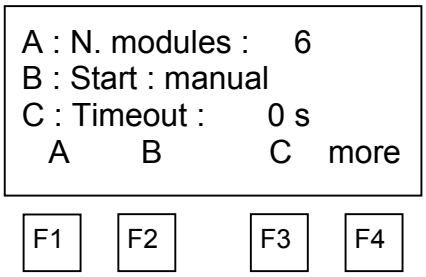
The sequence described above is repeated for each of the tests set, after which the statistical values are displayed in the ways previously described.

5.10

F2 Walkjump

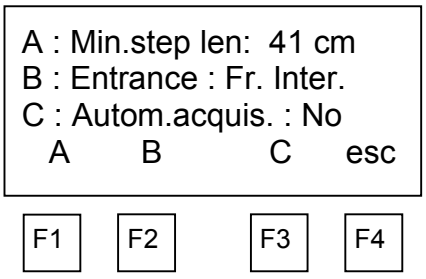
As well as contact and flight times, the WalkJump test makes it possible to acquire data for the length of the steps taken during a run. To obtain significant data, it is essential to use a certain number of OptoJump modules connected to each other and then positioned along the sides of the test track.

After selecting WalkJump with F2, the following current system settings are displayed:



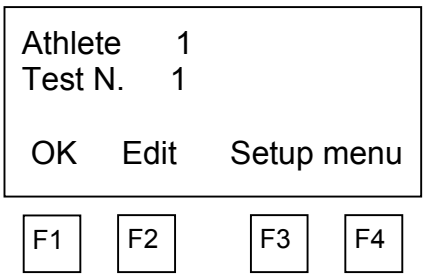
Number of modules (press F1 to modify the value set): specify the number of connected modules used for the test. For the acquisition of step length data to be correct, this value must correspond exactly to the number of modules installed.
Start mode (press F2 to modify the value set): specify 'manual' if data acquisition is started by a signal on the starting line (for example, by a photocell situated at the beginning of the measurement base, or by pressing the start key). Select 'autom' if you wish data acquisition to begin automatically when the athlete being tested enters the test base.
Timeout (press F3 to modify the value set): time elapsed in seconds, the acquisition of which is automatically interrupted. If the value '0' (zero) is set, acquisition finishes when an impulse on the starting line is sent (or the start key is pressed).

When F4 (other) is pressed, other settings are displayed, namely:



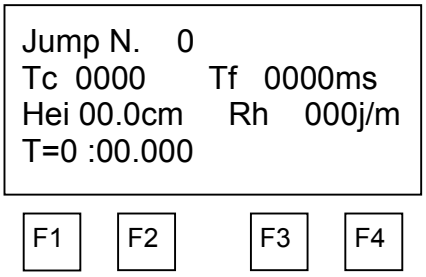
Minimum step length (press F1 to modify the value set): specify the minimum step length – this value is used during the acquisition of step length data to 'filter' possible false steps resulting from double contacts with the ground (heel – toe). Values below 20cm are not accepted. Racetime 2 always approximates the value set to a multiple of 3.1115cm (which is the interaxis between two successive data acquisition points).
Entrance (press F2 to modify the value set): specify the running direction. Int. side = the athlete runs the distance of the base after entering from the side with the interface for Racetime 2 or PC connection; cable side = the athlete runs the distance of the base after entering from the side with the connection cable between modules TX and RX.
Automatic acquisition (press F3 to modify the value set): select 'yes' if you want the system to automatically set itself to acquisition mode after each passage of an athlete, so as to make it possible to register two or more passages completely automatically.

5.11



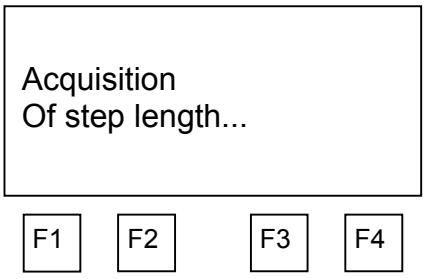
When F4 (esc) is pressed, the athlete's number and the number of the test for the trial to be performed are displayed.
(Important: the combination athlete's code/test number is a single item, that is to say, Racetime 2 does not allow the same athlete to perform two tests indicated by the same test number).
To modify the athlete's code and/or test number, press F2 (Edit.). Press F3 (Impos) to go back to modify the WalkJump test settings.
Press F1 to confirm the settings and go on to the performance of the test.

Before each data acquisition, the modules are initialized. During initialization a message 'Please wait' briefly appears.
It is important that the measurement area should not be crossed after acquisition, before the start of the test, otherwise the acquisition of step length may be incorrect.

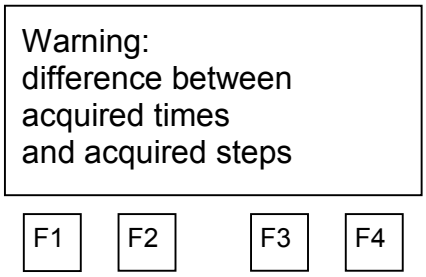


When initialization is terminated, the system is ready for acquisition, which will begin when a START signal is received (if 'manual' start has been chosen) or when the athlete being tested enters the measurement area (if 'automatic' start has been chosen).
The test finishes when another START signal is received (if timeout is set to zero) or after the time set as timeout from the start of the test has expired.
The test can be interrupted before completion by pressing CE.

It is possible to confirm by pressing F4 (OK) or to annul the whole test by pressing F3 (CleTst).

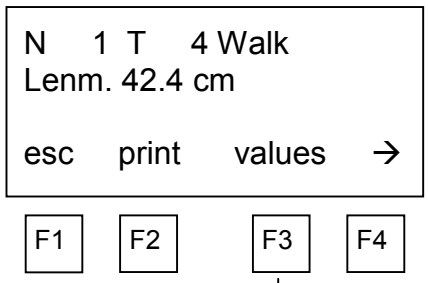


Step length is acquired at the end of the test. It is important that no one should enter the measurement area after the end of the test, before the acquisition of step length has finished. Acquisition can last a few seconds, especially if many modules are used.



If the number of steps registered does not coincide with the number of contact and flight times acquired, a warning message appears on the display. However, Racetime 2 memorizes all the information acquired: if the number of steps is higher than the number of contact/flight sequences, the extra steps will be given zero contact and flight times; should the opposite be the case (number of contact/flight sequences higher than steps acquired), the length of the extra steps will be zero.

5.12

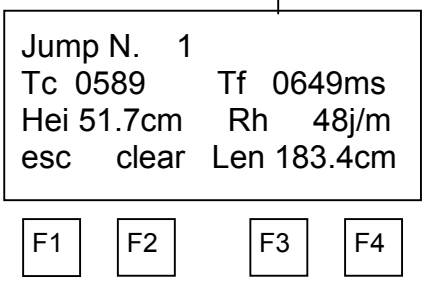


5.12

Press F1 (esc) to go on to the next test. The values of the test made obviously remain in the memory for subsequent reprinting.

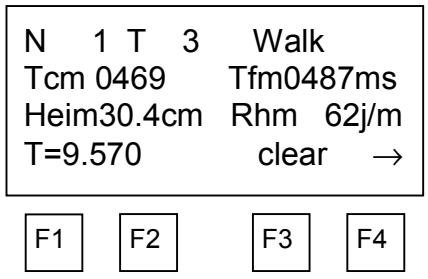
Press F2 (print) to obtain a printout of the values measured; for each jump, contact time, flight time, height, instantaneous rhythm and step length are printed. Average values for the same measurements are also given.
Note: printing takes place automatically when you pass to the next test if the automatic print mode has been set – see chap. 4.1.

Press F3 (values) to pass to the screen display of the individual jumps; press keys ↓ and ↑ to view the next or previous jump respectively. F2 (clear) eliminates the jump displayed. (Attention: it is not possible to annul elimination). F1 (esc) returns you to the display of average values.



5.13

By pressing F4 (→) you enter a second screen display in which you can see the average values for contact time, flight time, height and rhythm, as well as the real duration of the test. If two photocells connected to the start line are used to register entering and exiting of the base, the actual duration of the test coincides with the time taken to cover the distance of the base.
From this screen display, it is possible to completely eliminate the test performed by pressing F3. (Attention: it is not possible to annul elimination).
Press F4 again to return to the previous screen display.

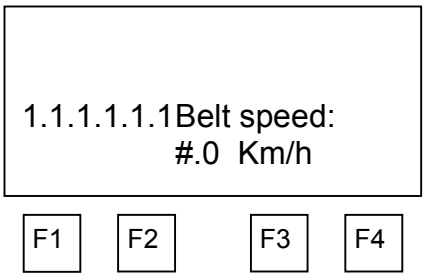


5.13

5.13

F3 RollJump

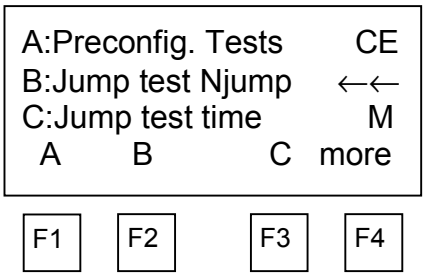
The RollJump test has been devised so as to make it possible to use the OptoJump system in combination with the mobile running boards (tapis roulant) used to simulate running in the gymnasium. The OptoJump system acquires contact and flight times during the run. Step length is calculated for a known running board speed.
Operating modes and the data displayed are analogous to those of the WalkJump test.



Before starting the test the speed of the running board must be specified.
To start the test, press the START key. To finish it, press START again. (Note: the test can be started and concluded also when the athlete being tested is running).
In this case the length of individual steps is also displayed during data acquisition.

6 Tests performed

Select this option to display, print or delete afterwards tests previously performed.



Press CE to return to the main menu.
Attention: if Racetime 2 finds no tests memorized, the message 'Not found' appears and it is not possible to enter the Tests performed mode.

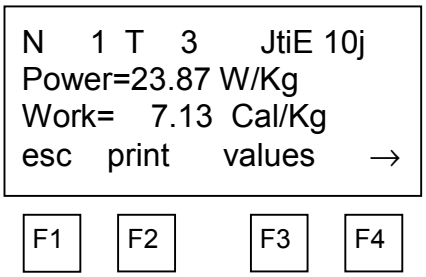
First choose the type of test you wish to view. The choices possible are obviously the same as those already listed in chapter 5 (New tests). An 'M' (Memory) on the third line of the display reminds us that we are in 'Display tests performed' mode.

6.1

After selecting the type of test, set the athlete and the number of test you wish to view. The number 0 (zero) enables you to call up all the tests, For example, if you set 0 as the athlete's number and 1 as the test number, the N.1 tests of all the athletes memorized will be displayed.

To modify the athlete's code and/or test number, press F2 (Edit)
To confirm the settings, press F1 (OK).

6.2



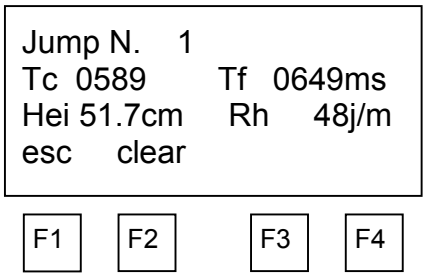
At this point you will see displayed the power and work values (for the Jumptest jumps and Jumptest time tests, only power for acoustic reaction tests), or average length for the WalkJump or RollJump tests.
In the upper part of the display the athlete's number and the test number continue to be displayed, together with the type of test, according to the following code:
JnbE# # #b– JumpTest N.jumps, external start, # # #=n. jumps
JnbI# # #b – JumpTest N.jumps, internal start, # # #=n. jumps
JteE# # #s – JumpTest time, external start, # # #=test duration
JteI# # #s – JumpTest time, external start, # # #=test duration
Walk - WalkJump
Roll # #. # - RollJump, # #. # = speed of mobile running board

Press ↓ or ↑ to call up the other tests which correspond to the athlete's number and test number previously set.

Press F1 (esc) to return to the selection menu for the tests performed.

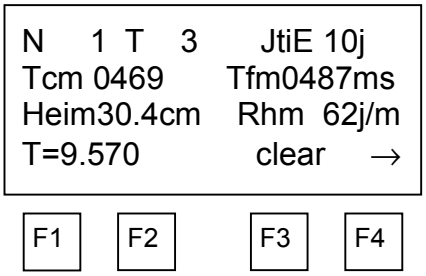
Press F2 (print) to obtain a printout of all the values for the test displayed (both average values and data for the single jump).

6.3



Press F3 (values) to pass to the screen display of the single jumps; press keys ↓ and ↑ to view the next or previous jump respectively. F2 (clear) eliminates the jump displayed. (Attention: it is not possible to annul elimination). F1 (esc) returns you to the display of average values.

6.4



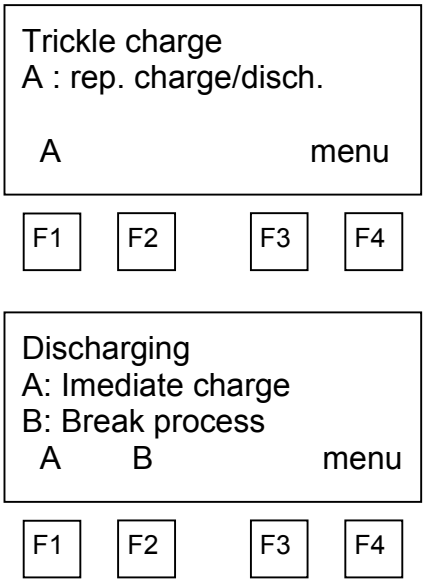
By pressing F4 (→) you enter a second screen display in which you can see the average values for contact time, flight time, height and rhythm, as well as the real duration of the test (calculated from the first departure from the ground until the last contact with it if the start is from outside the measurement area. If on the other hand the start takes place from inside the measurement area, the first departure from the ground is taken as the moment of the start).
From this screen display, it is possible to completely eliminate the test performed by pressing F3. (Attention: it is not possible to annul elimination).
Press F4 again to return to the previous screen display.

7 Recharging batteries

The recharging of Racetime2's internal batteries is managed entirely by the microprocessor which controls all of the chronometer's functions. Consequently, it has been possible to implement a recharge control which guarantees maximum battery efficiency at all times, at the same time prolonging the chronometer's operating life.
To recharge the batteries, connect the Racetime 2 battery recharger to the corresponding socket on the back of the device.
If the chronometer is off, information on the current status of the battery recharge management function will be immediately shown on the display.
Specifically, the following messages will appear on the first line of the display:

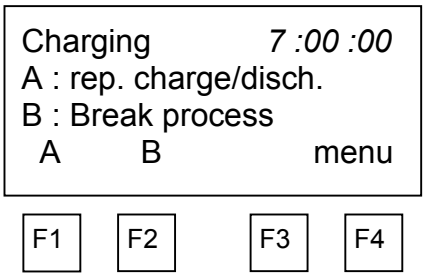
7.1.1.1 Status/message	Function description	LED status
Maintenance	the chronometer is supplied by an external power source and, simultaneously, the batteries' are kept 'fresh' by a weak recharge current	Brief blinking every four seconds
Discharge	at the beginning of a recharge cycle, the batteries are completely run down before being recharged	LED continuously lit
Recharge	recharge in progress. On the first line of the display, the time still to go until the end of recharge is shown.	Blinking LED

If you see the letters 'Vext. Ins' blinking on the first line of the display, this means that the voltage supplied at the recharge/supply input is insufficient. Attention: when external power is insufficient, recharging is interrupted and so cannot be completed correctly and within the time anticipated.



7.1

If the chronometer is in 'Maintenance', press F1 (A: Rep.charge/disch.) to begin a new charge cycle. This will start the running down of the batteries. The duration of this discharge phase is variable and depends on how fully the batteries are charged. (The time needed to discharge can last up to four hours).
After discharging the batteries, Racetime2 will automatically begin to recharge; this takes seven hours. After recharging, the words 'Charging over - OK' indicate that the process has been correctly completed. If, however, battery malfunction has caused premature interruption of charging, the messages 'Err. Batteries (LV)' (insufficient battery voltage) or 'Err. Batteries (HV)' (battery voltage too high) will appear.



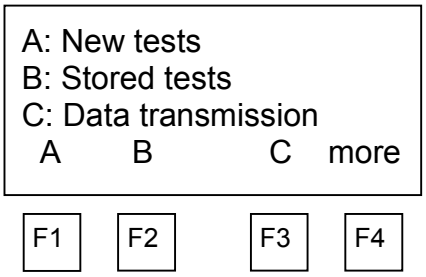
7.2

During discharging, it is possible at any time to go straight over to charging by pressing F1 (A: Rep. charge/disch.). This will shorten the time needed for recharging. However, you are advised not to charge the batteries without first discharging them as this could cause a reduction in the capacity of the batteries (memory effect).
At any moment, you can interrupt discharging/recharging by pressing F2 (B: Interrupt).

Note 1: if the external power source is cut off during charging, charging will be interrupted and resumed from the same point it had reached before being interrupted when the power source has been restored. This represents an extra guarantee of the reliability of the recharge system.

Note 2: during discharging and recharging, Racetime2 becomes slightly but noticeably warm. This is absolutely normal.

It is also possible to access these functions when the chronometer is on. In this way, you can begin to recharge the device without interrupting your timing session. To access recharge management, choose 'A: Recharge batt.' from the third screen display of the main menu.



7.3

Flat batteries warning. When the batteries have nearly run down completely and an external power source is not connected, a warning symbol blinks in the upper part of the display. From the time the symbol begins to blink, you still have a considerable amount of time to finish your work, nearly two hours without using the printer (but much less if the printer is used frequently). If it is not possible to quickly connect the chronometer to an external power source, it might be better to disconnect the printer (see para. C8.10) in order to increase remaining autonomous functioning.
Remember that when fully charged the batteries can be used continuously for approximately 8-9 hours, if the printout of a time is made every 20 seconds. Length of duration may be less in particularly harsh climatic conditions or if the batteries are worn out. It is absolutely normal for battery efficiency to decline after approximately 500-1000 recharge cycles. If you notice a significant reduction in the duration of the batteries, please contact Microgate for replacements

8 Memory limits

Racetime 2 makes possible the storage of data for about 2000 jumps (the number varies according to the number of different trials made).
When its memory limit has been reached, at each jump Racetime 2 displays the message ‘memory full’. Previously memorized data is not canceled, to enable the user, if he so wishes, to transfer information to the Personal Computer (chap. 4).
To cancel the memory, Racetime 2 must be switched off and the cancellation of data confirmed (chap. 3).

9 Appendix 1 - Racetime 2 transmission protocol for Optojump

All data are transmitted in ASCII format (values < 127 (7Fh) only), except the 'Program code'
All fields are numeric ones, padded with '0'

Description	N° of data	ASCII (Dec, Hex)	Notes
Header			
STX	1	2, 02h	Start of Text
Program code	10		'R2' followed by 8 blanks
CR	1	13,0Dh	Carrage Return
begin loop test			
Test type	3		02=Jumptest jumps, start intern 03= Jumptest jumps, start extern 04= Jumptest time, start intern 05= Jumptest time, start extern 06=Acoustic reaction 08=Walkjump 18 (12h)=Squatjump 34 (22h)=CMJ 50 (32h)=CMJ AF 66 (42h)=Technical test 83 (53h)=Stiffness 99 (63h)=Stiffness AF 116 (74h)=Jump 15s 132 (84h)=Jump 30s 148 (94h)=Jump 60s
Athlete's Code	4		<=9999, starts from 1
N.test	3		<=999, starts from 1
N jumps or	4		If length, in seconds
Daytime start	9		HHMMSSdcm ; includes the daytime of the test's beginning
Never know…	3		Reserved for future use
Average ground-contact time	5		in milliseconds
Average flight time	5		in milliseconds
Average rhythm	3		in jumps/minute
Average heigth	5		in millimeters ; <=00999
Average length	5		in millimeters ;
Specific power	5		in hundredths of W/Kg
Specific Work	5		in hundredths of Cal/Kg
Test length	6		MSSdcm ;
TAB	1	9, 09h	Tabulator
begin loop jumps			
Ground-contact times	5		in milliseconds
Flight times	5		in milliseconds
Rhythm	3		in jumps/minute
Heigth	5		in millimeters ; <=00999
Length	5		in millimeters ;
LF	1	10,0Ah	Line Feed
end loop jumps			
CR	1	13,0Dh	Carriage Return
end loop test			
ETX	1	3, 03h	End of Text
Checksum	1		(∑ascii) module 128

10 Appendix 2 - Formulas for the calculation of power and work

Specif power $W / Kg = \dfrac{g^2 \cdot \sum t_{volo} \cdot \left(\sum t_{volo} + \sum t_{contatto} \right)}{4 \cdot N_{salti} \cdot \sum t_{contatto}}$ (g = gravitational force)

Specific work $Cal / Kg = \dfrac{g^2 \cdot \sum t^2_{volo}}{4.186 \cdot 8}$

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